# BTEC Assignment Brief

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| **Qualification** | Pearson BTEC International Level 3 Subsidiary Diploma in Engineering<br>Pearson BTEC International Level 3 Foundation Diploma in Engineering<br>Pearson BTEC International Level 3 Diploma in Engineering<br>Pearson BTEC International Level 3 Diploma in Electrical/Electronic Engineering<br>Pearson BTEC International Level 3 Diploma in Mechanical Engineering<br>Pearson BTEC International Level 3 Diploma in Manufacturing Engineering<br>Pearson BTEC International Level 3 Extended Diploma in Engineering<br>Pearson BTEC International Level 3 Extended Diploma in Electrical/Electronic Engineering<br>Pearson BTEC International Level 3 Extended Diploma in Mechanical Engineering<br>Pearson BTEC International Level 3 Extended Diploma in Digital Engineering |
| **Unit number and title** | **Unit 44: Fabrication Manufacturing Processes** |
| **Learning aim(s)** | **B:** Carry out the preparation necessary to manufacture a fabricated product<br>**C:** Carry out fabrication processes to manufacture a fabricated product |
| **Assignment title** | 2 Prepare for and carry out the manufacture of a fabricated product safely. |
| **Assessor** | |
| **Issue date** | |
| **Hand in deadline** | |

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| **Vocational Scenario or Context** | You have just joined a manufacturing company as an apprentice product design engineer. As part of your induction have been asked to spend two weeks working on the shop floor and product development workshops. This will allow you to become familiar with the equipment and process capabilities available within the company.<br>As part of your induction training you have been asked to make a prototype tool box based on drawings supplied by your colleagues in the design office. This new design has not yet been put into production and the component blanks sizes have not yet been developed and verified.<br>You have been asked to maintain a training log book during your induction training to record your experiences, technical information and notes on your growing skills and personal development. |

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| **Task 1** | You have been asked to demonstrate that you are able to prepare for and complete the manufacture of a sheet metal product consisting of at least four formed components.<br><br>**To do this:**<br>Your tutor will provide you with individual component engineering drawings and appropriate sub and general assembly drawings for a tool box. The tool box is to be made from sheet metal product, and has at least four formed components. You need to:<br>• Complete research into the health and safety requirements when setting up and using fabrication manufacturing processes; and<br>• Manufacture the tool box using information in the given engineering drawings, carrying out appropriate quality control checks to ensure accuracy of the finished product.<br><br>**You then need to:**<br>Complete all the activities necessary to prepare for and complete the manufacture of the tool box detailed on the component and assembly drawings supplied by your tutor. During these activities you must complete a training log book to record the details of your progress, including refinements you have made to the blank design, set-up and machining parameters. The activities to complete are:<br>• A health and safety risk assessment of the fabrication workshop, including all the processes to be carried out, accompanied by information about how health and safety is managed and regulations that need to be met when they are using machinery.<br>• Component blank size calculations based on information from given engineering drawings.<br>• Modelling, testing and refinement of component blanks in card to confirm fit and function.<br>• Marking up stock sheet material with component blanks in preparation for cutting.<br>• Set up the necessary workshop equipment, including work holding devices, and machines to prepare for manufacturing of component;<br>• Manufacture, using at least two cutting processes and two forming processes, the component parts of the toolbox. You should refine set up and machining parameters to ensure accurate, consistent and efficient component manufacture.<br>• Assembly of components into a complete, finished toolbox, using at least two different joining processes. You should record the dimensions of your toolbox and compare these with the acceptable tolerances shown on your given engineering drawings.<br><br>Throughout the manufacturing processes, you should use quality control methods to check the accuracy of the formed components and finished product and use this data to help evaluate the effectiveness of the manufacturing processes used. You should also make notes on the setup and your safe, accurate use of tools and equipment used to fabricate the |

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| | components. |
| **Checklist of evidence required** | Evidence must include:<br>• A training log book containing notes, sketches and photographs of the activities undertaken in the completion of this task.<br>• Health and safety risk assessments<br>• Component models and blanks including notes explaining any modifications made.<br>• Manufacturing aids such as forming gauges.<br>• A completed sheet metal tool box.<br>• Manufacturing notes that might include machine settings or refinements made during manufacture or modelling.<br><br>Tutor observation records will be required to support any evidence of practical and skills based activities recorded in your training log. |

| **Criteria covered by this task:** | |
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| Unit/Criteria reference | To achieve the criteria you must show that you are able to: |
| 44/BC.D2 | Refine the blank design, set-up and parameters of the fabrication equipment to safely, effectively and efficiently manufacture a fabricated product. |
| 44/B.M2 | Analyse component blanks through modelling and safely and accurately mark components out |
| 44/C.M3 | Manufacture a fabricated product safely and accurately containing at least four formed components joined using at least two processes |
| 44/B.P2 | Explain what health and safety requirements apply when using fabrication processes |
| 44/B.P3 | Set up safely at least two cutting, two forming and two joining processes to include a risk assessment of the work environment |
| 44/C.P4 | Manufacture safely at least four fabricated formed components using at least two cutting processes and at least one forming process |
| 44/C.P5 | Manufacture safely a fabricated product containing at least four formed components joined using at least two processes |

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| **Sources of information to support you with this Assignment** | **Textbooks**<br><br>Fournier, R, *Sheet Metal Handbook*, Penguin Putnam Inc, 1987 ISBN 9780895867575. Useful practical handbook covering many traditional metal forming techniques used in low volume manufacturing.<br><br>Timings, R, *Fabrication and Welding Engineering*, Newnes, 2008 ISBN 0750666919. Provides comprehensive coverage of sheet metalworking and welding in the manufacture of fabricated products.<br><br>Wakeford, R, *Sheet Metal Work Workshop Practice,* Special Interest Model, 1987 ISBN 9780852428498. Useful practical guide to working with sheet metal.<br><br>**Websites**<br><br>britishmetalforming.com is the homepage of the Confederation of British Metalforming, a UK trade |

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| | body representing the interests of the metal forming industry.<br><br>hse.gov.uk is the homepage of the Health and Safety Executive in the UK that provides a wealth of information including guides to health and safety regulations and risk assessment, HSE.<br><br>qualitytool.com/resources/Design-Handbook-Rev3.pdf is a useful guide to industrial cutting and forming processes, Quality Tool.<br><br>thelibraryofmanufacturing.com/index.html is a useful online resource that covers a range of manufacturing processes including sheet metal fabrication, thelibraryofmanufacturing.com<br><br>Above are some examples of websites. Further useful resources may be found at qualifications.pearson.com/en/support/published-resources.html#step1 |